

RECORDS OF NYCTERIBIIDAE AND STREBLIDAE (DIPTERA, PUIPARA) IN KARNATAKA, INDIA¹

H. R. BHAT, M. A. SREENIVASAN AND
M. A. ILKAL²

During a survey of bats and their ectoparasites in the western part of Karnataka in connection with Kyasanur Forest disease epidemiological studies, 1921 specimens of Nycteribiid and Streblid flies were collected. These specimens represent 10 genera and 24 species. They are recorded here with notes on geographic range and host relationship.

INTRODUCTION

The available information on Indian Nycteribiids and Streblids is scattered and scanty, except for a small monograph on ectoparasites of bats from India by Hiregaudar and Bal (1956), which includes 16 species belonging to these two families, occurring in southern India.

The present communication deals with material collected during a survey of bats and their ectoparasites in connection with the serological studies on Kyasanur Forest disease. In all 1921 specimens (947 males and 974 females) were collected. They represent 10 genera and 24 species and are recorded with additional notes on geographic range and host relationships. Perhaps this is the largest collection of Nycteribiids and Streblids ever made in India.

The classification and nomenclature here are based on the system of Maa (1962, 1965, 1966, 1968 and 1969) and Theodor (1955, 1967, 1968a and 1968b).

The area covered during the survey includes

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² Virus Research Centre, Indian Council of Medical Research, Poona, India.

Belgaum, Bijapur, Chitradurga, Coorg, Dharwar, Hassan, Shimoga, South Kanara and North Kanara districts of Karnataka State.

MATERIAL AND METHODS

The bats were collected by trapping them in mist nets or in sweep nets from their daytime roost or foraging areas. Whenever it was necessary they were also collected by shooting. They were killed with chloroform vapour, wrapped in white lint cloth and held for four to six hours to allow any live ectoparasites to detach. All the detached ectoparasites were collected and preserved in 70 per cent alcohol after identification.

RESULTS—RECORDS AND NOTES ON SPECIES

Family NYCTERIBIIDAE Westwood, 1840

Sufamily Nycteribiinae Westwood, 1840

Genus *Nycteribia* Latreille, 1796

Subgenus *Nycteribia* Latreille, 1796

1. *Nycteribia* (*Nycteribia*) *allotopa* Speiser, 1901

Material examined: 54 ♂♂, 42 ♀♀, all from *Miniopterus schreibersi*.

BELGAUM: 15 ♂♂, 9 ♀♀, removed from bats; 3 ♂♂, 3 ♀♀, from roost; Thigadi, respectively on 18.vi.71 and 5.viii.71. SHIMOGA: 2 ♂♂, 2 ♀♀, Kotipura, 22.viii.71. 14 ♂♂, 15 ♀♀; 20 ♂♂, 13 ♀♀; Kavaledurga, respectively on 18.ii.72 and 3.iv.72.

Notes: Originally described from 1 ♂ and 1 ♀, ex *M. schreibersi* collected at Lian Si Pache, W. Sumatra, subsequently recorded from India, Ceylon, Burma, Taiwan, Kiangsu, Moluccas, Philippines, China and Japan from the same host.

The colonies of *M. schreibersi* were also inhabited by other species of bats, but the parasite was not found on them.

2. *Nycteribia (Nycteribia) parvula* Speiser, 1901

Material examined: 73 ♂♂, 64 ♀♀, ex *M. schreibersi*, 1 ♂, ex *Rhinolophus lepidus*.

BELGAUM: 12 ♂♂, 13 ♀♀; 13 ♂♂, 6 ♀♀; Thigadi, respectively on 18.vi.71 and 5.viii.71. SHIMOGA: 29 ♂♂, 25 ♀♀, Kotipura, 22.vii.71. 13 ♂♂, 12 ♀♀; 6 ♂♂, 8 ♀♀; Kavaledurga, respectively on 18.ii.72 and 3.iv.72. 1 ♂, ex *R. lepidus*, Kavaledurga, 3.iv.72.

Notes: Originally described from 2 ♀♀ collected at Lian Si Pache, Sumatra, ex *M. schreibersi*. It has a common distribution range and host specificity with *N. allotopa*. Occurrence on *R. lepidus* is obviously as straggler, as it was cohabiting with *M. schreibersi*.

Genus *Styldia* Westwood, 1840

3. *Styldia ceylonica* Theodor, 1967

Material examined: 5 ♂♂, 5 ♀♀, ex *Hipposideros lankadiva*; 1 ♀, ex *Hipposideros speoris*.

NORTH KANARA: 2 ♂♂, ex *H. lankadiva*; 1 ♀, ex *H. speoris*, Gersoppa, 2.xi.71. 1 ♂, 4 ♀♀, ex *H. lankadiva*, Muroor, 31.v.71; 1 ♀, ex *H. lankadiva*, Nislineer, 22.iv.73. SOUTH KANARA: 2 ♂♂, 2 ♀♀, ex *H. lankadiva*, Kamalashile, 10.iv.73.

Notes: So far known only from Sri Lanka ex *H. lankadiva*. Occurrence on *H. speoris* appears to be a straggler as it was cohabiting with *H. lankadiva*.

4. *Styldia phillipsi* (Scott, 1925)

Material examined: 40 ♂♂, 52 ♀♀, ex *Rhinolophus rouxi*; 1 ♂, ex *Hipposideros bicolor*.

SHIMOGA: 4 ♂♂, 7 ♀♀; 1 ♂, 4 ♀♀; Haravadike, respectively on 20.iii.68 and 18.vi.68. 1 ♂, 4 ♀♀, Nellikoppa, 20.iii.68. 3 ♂♂, 3 ♀♀, Tho-

ragodu, 11.v.68. 3 ♂♂; 6 ♂♂, 4 ♀♀; 1 ♂, 3 ♀♀; 6 ♂♂, 2 ♀♀; 3 ♂♂, 3 ♀♀; Kasaraguppe, respectively on 23rd and 31.v.68, 13, 22 and 26.vi.68. 3 ♂♂, 7 ♀♀, Hale Ikkeri, 3.v.71. 4 ♂♂, 3 ♀♀, Gilalgundi, 14.vii.71. 1 ♀, Byrekoppa, 25.xi.71.

COORG: 3 ♀♀, Gadduge gate, 31.vii.71. N. KANARA: 1 ♀, Kagaal, 5.xi.71. 5 ♂♂, 7 ♀♀, Muroor, 29.iii.72. 1 ♂, ex *H. bicolor*, Muroor, 31.v.72.

Notes: The species has been recorded earlier from Ceylon and India ex *R. rouxi*. The record ex *H. bicolor* appears to be of a straggler, because the species was associated with *R. rouxi*.

5. *Styldia* sp. 1

Material examined: 1 ♂, ex *R. lepidus*.

NORTH KANARA: 1 ♂, Muroor, 29.iii.72.

Notes: The species resembles *S. szechuana* (Theodor, 1954) closely.

6. *Styldia* sp. 2

Material examined: 3 ♂♂, 17 ♀♀, ex *R. lepidus*, Kavaledurga, SHIMOGA, 3.iv.72. 2 ♀♀, ex *R. lepidus*, Kamalashile, SOUTH KANARA, 10.iv.73.

Genus *Basilisa* Miranda Ribeiro, 1903

Subgenus *Basilisa* Miranda Ribeiro, 1903

7. *Basilisa (Basilisa) majuscula* (Edwards, 1919)

Material examined: 24 ♂♂, 41 ♀♀, ex *Pipistrellus ceylonicus*.

BELGAUM: 1 ♀, Thigadi, 5.viii.71. BIJAPUR: 1 ♂, 1 ♀, Badami, 15.ix.71. CHITRADURGA: 1 ♂, 7 ♀♀, Chitradurga, 24.vi.71. DHARWAR: 3 ♂♂, 1 ♀, Kagineelli, 16.vii.71; 6 ♂♂, 6 ♀♀, Uppinbetgeri, 4.viii.71; 2 ♀♀, Amminbhavi, 4.viii.71; 1 ♂, 1 ♀, Nargund, 13.ix.71. HASSAN: 1 ♂, 4 ♀♀, Banavara, 28.vii.71. SHIMOGA: 4 ♂♂, 1 ♀, Ikkeri, 9.vii.71; 7 ♂♂, 17 ♀♀, Sagar, 11.v.72.

Notes: Earlier recorded from India, Java, Sumatra and Philippines ex *Pipistrellus* spp. The Indian form was originally described as *B. scotti* Hiregaudar and Bal, 1956 and was later synonymised with *B. majuscula* by Theodor, 1967.

8. *Basilisa (Basilisa)* sp.

Material examined: 7 ♂♂, 12 ♀♀, ex *Myotis peshwa*, Vakkund, BELGAUM, 19.vi.71.

Notes: The species comes close to *B. nana* Theodor and Moscana, 1954.

Subgenus *Paracyclopodia* Scott, 1917

9. *Basilisa (Paracyclopodia) roylii roylii* (Westwood, 1835)

Material examined: 10 ♂♂, 23 ♀♀, ex *Scotophilus temmincki*.

SHIMOGA: 2 ♂♂, 4 ♀♀, Sagar town, 11.v.72.
NORTH KANARA: 8 ♂♂, 19 ♀♀, Nagire near Gersoppa, 4.xi.71.

Notes: Recorded from India, Ceylon, Burma and Malaya. Recorded hosts are *Scotophilus* spp., *Hesperotenus tickelli*, *Tylonycteris pachypus*, *Megaderma lyra* and *Pipistrellus coromandra*.

Subgenus *Tripselia* Scott, 1917

10. *Basilisa (Tripselia) blainvillii amiculata* (Speiser, 1907)

Material examined: 1 ♂, 1 ♀, ex *Taphozous longimanus*, Ikkeri, SHIMOGA, 30.xii.71.

Notes: Earlier records are from India, Burma, Ceylon, Borneo and Sumatra ex *Taphozous* spp.

Genus *Penicillidia* Kolenati, 1863

Subgenus *Penicillidia* Kolenati, 1863

11. *Penicillidia (Penicillidia) indica* Scott, 1925

Material examined: 29 ♂♂, 23 ♀♀, ex *M. schreibersi*.

BELGAUM: 2 ♂♂, 8 ♀♀, Thigadi, 18.vi.71.
SHIMOGA: 2 ♂♂, 2 ♀♀, Kotipura, 22.vii.71.
20 ♂♂, 6 ♀♀; 5 ♂♂, 7 ♀♀; Kavaledurga, respectively on 18.ii.72 and 3.iv.72.

Notes: Earlier records are from India ex *M. schreibersi* and Ceylon ex *M. schreibersi* and *P. ceylonicus*.

12. *Penicillidia* sp.

Material examined: 1 ♂, 1 ♀, ex *R. lepidus*, MURDOOR, N. KANARA, 29.iii.72.

Subfamily Cyclopediinae Theodor, 1967

Genus *Eucampsipoda* Kolenati, 1857

13. *Eucampsipoda latisterna* Schuurmans Stekhoven, 1938

Material examined: 169 ♂♂, 126 ♀♀, ex *Rousettus leschenaulti* and 1 ♂, ex *H. lankadiva*.

SHIMOGA: 6 ♂♂, 7 ♀♀; 4 ♂♂, 3 ♀♀; Nadakalasi, respectively on 7.ii.68 and 1.vii.71. 11 ♂♂, 16 ♀♀, Horabail, 17.ii.68. 6 ♂♂, 7 ♀♀, Mungarvalli, 21.ii.68. 1 ♂, 3 ♀♀, Heggodu (Sorab), 9.iii.68. 1 ♂, 2 ♀♀, Patresalu, 22.iii.68. 17 ♂♂, 15 ♀♀, Ikkeri, 16.vi.71. 3 ♂♂, 2 ♀♀, Mundigesara, 10.ix.71. 6 ♂♂, 5 ♀♀; 18 ♂♂, 7 ♀♀; Kangodu, respectively on 10.ix.71 and 15.x.71. 7 ♂♂, 6 ♀♀; 12 ♂♂, 7 ♀♀; Harogoppa, respectively on 27.x.71 and 18.xi.71. 4 ♂♂, 3 ♀♀, Bileyur, 19.xi.71. 9 ♂♂, 5 ♀♀, Bandagadde, 17.xi.71. BELGAUM: 3 ♂♂, 3 ♀♀, Thigadi, 21.vi.71. NORTH KANARA: 34 ♂♂, 23 ♀♀, Kagaal, 8.xi.71, 12 ♂♂, 8 ♀♀; 15 ♂♂, 4 ♀♀; Muroor, respectively on 7.iv.72 and 31.v.72. 1 ♂, ex *H. lankadiva*, Muroor, 31.v.72.

Notes: Originally recorded under *Eucampsipoda hyrtlui* ex *R. leschenaulti* from Orissa, Assam and Bombay in India; ex *R. seminudus* and *Tylonycteris pachypus* from Sri Lanka and from a cave in Thailand. The record from *H. lankadiva* is apparently of a straggler.

14. *Eucampsipoda sundaica* Theodor, 1955

Material examined: 59 ♂♂, 37 ♀♀, ex *Eonycteris spelaea* and 1 ♂, 1 ♀, ex habitat of the same species in association with *R. leschenaulti*; 1 ♀, ex *H. speoris* from the same habitat.

NORTH KANARA: 24 ♂♂, 15 ♀♀; 17 ♂♂, 13 ♀♀; 12 ♂♂, 6 ♀♀; Nislneer respectively on 8.xi. and 10.xii.72 and 10.i.73. 1 ♂, 1 ♀, from habitat on 8.xi.72. 6 ♂♂, 3 ♀♀; Muroor, 1.i.73. 1 ♀, ex *H. speoris*, Nislneer, 30.xi.73.

Notes: The species has been recorded ex *C. sphinx* from Madras, ex *Pteropus* from Burma, in a cave from Thailand, ex *E. spelaea* from Malaya and Sumatra ex *Rousettus amplexicaudatus* and *E. spelaea glandifera* from Philippines, Mindanao and Palwan (Theodor 1955 and 1967; Maa 1962). Recently the species was also recorded ex *E. spelaea* from Kumaon hills in the western Himalayas (Bhat and Kulkarni 1974).

Genus *Cyclopodia* Kolenati, 1863

Subgenus *Cyclopodia* Kolenati, 1863

15. *Cyclopodia (Cyclopodia) sykesii* (Westwood, 1835)

Material examined: 8 ♂♂, 12 ♀♀, ex *Pteropus giganteus*, Kumsi, SHIMOGA, 9.xi.71.

Notes: Recorded from several localities in India, Sri Lanka and Burma ex *Pteropus giganteus*. There is a single record from China. It may be mentioned here that *Cyclopodia kalyania* Chaudhari and Mitra, 1965 is a synonym of *C. sykesii* according to Maa (1968).

Genus *Leptocyclopodia* Theodor, 1959

Subgenus *Leptocyclopodia* Theodor, 1959

16. *Leptocyclopodia (Leptocyclopodia) ferrarii ferrarii* (Rondani, 1878)

Material examined: 16 ♂♂, 7 ♀♀, ex *Cynopterus sphinx*.

SHIMOGA: 2 ♂♂, Nadakalasi, 18.ii.68. 1 ♂, 1 ♀, Lingadahalli (Chipli), 9.ii.68. 2 ♂♂ Horabail, one each on 17.ii.68 and 30.v.68. 1 ♂, 2 ♀♀, Hengere, 5.iii.68. 1 ♀, Sagar, 1.vii.71. 3 ♂♂, Kangodu, 15.x.71. 3 ♂♂, 2 ♀♀; 4 ♂♂, 1 ♀; Harogoppa, respectively on 27.x.71 and 18.xi.71.

Notes: Earlier records are ex *C. sphinx* from several localities in India and one record ex *Megaderma lyra*; ex *C. brachyotis* and *C. sphinx* from Ceylon; ex *C. sphinx* from Thailand; ex *C. brachyotis* from Malaya, Sumatra and Borneo; ex *C. horsfieldi* from Java; and also recorded in Vietnam, Cambodia ex undet. hosts.

Family STREBLIDAE Kolenati, 1863

Subfamily Brachytarsinae Maa, 1965

Genus *Megastrebla* Maa, 1971

Subgenus *Megastrebla* Maa, 1971

17. *Megastrebla (Megastrebla) parvior parvior* Maa, 1962

Material examined: 17 ♂♂, 17 ♀♀, ex *R. leschenaulti*; 24 ♂♂, 16 ♀♀, ex *E. spelaea*; and 1 ♀, ex *H. speoris*.

NORTH KANARA: 2 ♂♂, 1 ♀; 1 ♂, 7 ♀♀; 12 ♀♀, 8 ♀♀; ex *R. leschenaulti*, Muroor, respectively on 8.xi.71, 31.v.72 and 3.vi.72. 24 ♂♂,

16 ♀♀, ex *E. spelaea*, 1 ♀, ex *H. speoris* from common habitat at Nislneer, 30.xi.73. SHIMOGA: 2 ♂♂, ex *R. leschenaulti* Kangodu, 15.x.71. 1 ♀, Harogoppa, 27.x.71.

Notes: The species was originally recorded under the name *Nycteribosca gigantea* (syn: *Brachytarsina gigantea*) (Jobling, 1934) which is apparently restricted to the bat genus *Dobsonia* (Maa, 1962) in New Guinea, New Britain and Solomon Islands. The species is described under the present name *parvior* by Maa (1962) on the basis of material collected in Sumba ex *R. amplexicaudatus* and in Malaya ex *Hipposideros* sp. and Batu caves, probably inhabited by *Eonycteris spelaea*. Recently the species was transferred under the present genus by Maa (1971).

Genus *Brachytarsina* Macquart, 1851

18. *Brachytarsina amboinensis* (Rondani, 1878)

Material examined: 50 ♂♂, 79 ♀♀, ex *M. schreibersi*.

BELGAUM: 7 ♂♂, 6 ♀♀; 4 ♂♂, 5 ♀♀; Thigadi, respectively on 18.vi.71 and 5.viii.71. SHIMOGA: 9 ♂♂, 20 ♀♀; Kotipura, 22.vii.71. 18 ♂♂, 20 ♀♀; 12 ♂♂, 28 ♀♀; Kavaledurga, respectively on 18.ii.72 and 3.iv.72.

Notes: According to the available records the species has a geographic range from India to Ryukyu Island, New Caledonia and New South Wales. It occurs chiefly on *Miniopterus*. Occasionally it has also been recorded from *Eonycteris*, *Rousettus*, *Rhinolophus* and *Hipposideros*. The records on these species are apparently of stragglers due to the cohabitation of different bat species in the same habitat.

19. *Brachytarsina cucullata* (Jobling, 1934)

Material examined: 3 ♂♂, 8 ♀♀, ex *Taphozous melanopogon*.

BIJAPUR: 2 ♂♂, 7 ♀♀, Badami, 14.ix.71. HASAN: 1 ♂, 1 ♀, Halebid, 1.viii.71.

Notes: Originally described upon a male ex *T. melanopogon* from Sri Lanka. It has

been recorded from Mindanao ex *T. melanopogon* and *C. brachyotis*, and from Malaya ex *T. melanopogon*.

20. **Brachytarsina modesta** (Jobling, 1934)

Material examined: 17 ♂♂, 31 ♀♀, ex *R. lepidus*; and 28 ♂♂, 30 ♀♀, ex *R. rouxi*.

NORTH KANARA: ex *R. lepidus*, 3 ♂♂, 5 ♀♀ Muroor, 29.iii.72. Ex *R. rouxi*: 14 ♂♂, 7 ♀♀, Muroor, 29.iii.72. 10 ♂♂, 5 ♀♀, Gokarn, 30.v.72. SHIMOGA: ex *R. lepidus*: 1 ♀, Jog, 5.i.72. 12 ♂♂, 21 ♀♀, Kavaledurga 3.iv.72. Ex *R. rouxi*: 1 ♀, Haravadike, 18.vi.68. 11 ♀♀, Ikkeri, 3.v.71. 4 ♂♂, 6 ♀♀, Gilalagundi, 14.vii.71. SOUTH KANARA: 2 ♂♂, 4 ♀♀, ex *R. lepidus*, Kamalashile, 10.iv.73.

Notes: First described by Jobling ex *R. rouxi* from Sri Lanka and subsequently the species was recorded in India from the same species of bat (Hiregaudar and Bal 1956).

21. **Brachytarsina pygialis** (Jobling, 1934)

Material examined: 19 ♂♂, 40 ♀♀, ex *H. lankadiva* and 2 ♀♀ ex *H. speoris*.

BELGAUM: 1 ♂, 1 ♀, Thigadi, 18.vi.71. CHITRADURGA: 1 ♀, Chandravalli, 25.vi.71. HASSAN: 7 ♀♀, Banavara, 28.vii.71. NORTH KANARA: ex *H. lankadiva*: 3 ♂♂, 5 ♀♀; 2 ♂♂, 1 ♀; Gersoppa, respectively on 15.iii.71 and 2.xi.71. 10 ♂♂, 15 ♀♀, Muroor, 31.v.72. Ex *H. speoris*: 2 ♀♀, Gersoppa, 15.iii.71. SOUTH KANARA: 3 ♂♂, 10 ♀♀, ex *H. lankadiva*, Kamalashile, 10.iv.73.

Notes: Originally described on specimens collected ex *H. lankadiva* from Sri Lanka. From the present record it appears to be associated with *H. lankadiva*. Record from *H. speoris* is apparently of stragglers due to cohabitation of the bats.

Genus *Raymondia* Frauenfeld, 1856

22. **Raymondia joblingi** Hiregaudar and Bal, 1956

Material examined: 45 ♂♂, 56 ♀♀, ex *R. rouxi* and 2 ♂♂, 2 ♀♀, ex *R. lepidus*.

COORG: 3 ♂♂, 3 ♀♀, Gadduge Gate, 31.vii.71. NORTH KANARA: 3 ♀♀, Kagaal, 5.xi.71. 5 ♂♂, 4 ♀♀, Muroor, 29.iii.72. 18 ♂♂, 21 ♀♀, Gokarn, 30.vi.72. SHIMOGA: 1 ♀, Haravadike, 20.iii.68. 1 ♀, Thoragodu, 11.v.68. 1 ♂, 1 ♀; 2 ♂♂, 4 ♀♀;

1 ♂; Kasaraguppe, respectively on 31.v, 13.vi, 26.vi. 68. 1 ♂, 10 ♀♀, Ikkeri, 3.v.71. 13 ♂♂, 6 ♀♀, Gilalagundi, 14.vii.71. 1 ♂, 2 ♀♀, Byrekoppa, 25.xi.71. Ex *R. lepidus*: 2 ♂♂, 1 ♀, Jog falls, 5.i.72. 1 ♀, Kavaledurga, 3.iv.72.

Notes: First described from India ex *R. rouxi* by Hiregaudar and Bal (1956). Appears to be associated with *R. rouxi*. *R. lepidus* and *R. rouxi* are commonly found in association with each other.

23. **Raymondia molossa** (Giglioli, 1864)

Material examined: 211 ♂♂, 206 ♀♀, ex *Megaderma lyra*.

SHIMOGA: 14 ♂♂, 11 ♀♀, Gilalagundi, 14.vii.71. 6 ♀♀, Bileyur, 19.xi.71. 42 ♂♂, 29 ♀♀, Gavaator near Ripponpeth, 2.xii.71. 15 ♂♂, 18 ♀♀, Kudroor, 9.xii.71. 35 ♂♂, 35 ♀♀, Kangodu, 1.ii.72. 54 ♂♂, 56 ♀♀, Uddri, 26.v.72. 27 ♂♂, 28 ♀♀, Bandalike, 26.v.72. NORTH KANARA: 24 ♂♂, 23 ♀♀, Banavasi, 17.vi.71.

Notes: The species has been recorded from Sri Lanka and India under the name *R. lobulata* (Speiser, 1900) by Jobling (1930). Consequently the species is designated as *R. molossa* comb. nov. by Maa (1969).

24. **Raymondia pagodarum** Speiser, 1900

Material examined: 26 ♂♂, 19 ♀♀, ex *Hipposideros* spp.

DHARWAR: 4 ♂♂, 4 ♀♀, ex *H. bicolor*, Uppinbetgeri, 4.viii.71. 1 ♂, 2 ♀♀, ex *H. bicolor*, Nargund, 13.ix.71. NORTH KANARA: 1 ♂, 6 ♀♀, ex *H. bicolor*, Gokarn, 30.v.72. 15 ♂♂, 5 ♀♀, ex *H. speoris*, Muroor, 29.iii.72. 5 ♂♂, 2 ♀♀, ex *H. lankadiva*, Muroor, 31.v.72.

Notes: The species has been recorded from *Hipposideros* spp. and *Rhinolophus* spp. from India, Sri Lanka, Burma, Southeast Asia and Pacific Islands.

DISCUSSION

A total number of 24 species of bats have been collected during the survey. Sixteen species of them had one or more species of pupiparan parasites and eight of them did not yield any pupiparan parasite. The details of host

RECORDS OF NYCTERIBIIDAE AND STREBLIDAE

HOST-PARASITE LIST

<i>Rousettus leschenaulti</i>	<i>Eucampsipoda latisterna</i>
	<i>Megastrebla parvior parvior</i>
<i>Pteropus giganteus</i>	<i>Cyclopodia sykesii</i>
<i>Cynopterus sphinx</i>	<i>Leptocyclopodia ferrarii ferrarii</i>
<i>Eonycteris spelaea</i>	<i>Eucampsipoda sundaica</i>
	<i>Megastrebla parvior parvior</i>
	—
<i>Rhinopoma hardwickei</i>	<i>Basilisa blainvillii amiculata</i>
<i>Taphozous longimanus</i>	<i>Brachytarsina cucullata</i>
<i>Taphozous melanopogon</i>	—
<i>Taphozous theobaldi</i>	—
<i>Taphozous kachhensis</i>	—
<i>Megaderma spasma</i>	—
<i>Megaderma lyra</i>	<i>Raymondia molossa</i>
<i>Rhinolophus rouxi</i>	<i>Stylidia phillipsi</i>
	<i>Brachytarsina modesta</i>
	<i>Raymondia joblingi</i>
<i>Rhinolophus lepidus</i>	<i>Nycteribia parvula</i> (straggler?)
	<i>Stylidia</i> sp. 1 (straggler?)
	<i>Stylidia</i> sp. 2
	<i>Penicillidia</i> sp.
	<i>Brachytarsina modesta</i>
	<i>Raymondia joblingi</i>
	—
<i>Rhinolophus luctus</i>	<i>Stylidia ceylonica</i> (straggler?)
<i>Hipposideros speoris</i>	<i>Brachytarsina pygialis</i>
	<i>Raymondia pagodarum</i>
	<i>Eucampsipoda sundaica</i> (straggler?)
	<i>Megastrebla parvior parvior</i> (straggler?)
<i>Hipposideros lankadiva</i>	<i>Stylidia ceylonica</i>
	<i>Eucampsipoda latisterna</i> (straggler?)
	<i>Brachytarsina pygialis</i>
	<i>Raymondia pagodarum</i>
<i>Hipposideros bicolor</i>	<i>Stylidia phillipsi</i> (straggler?)
	<i>Raymondia pagodarum</i>
	<i>Basilisa</i> sp.
	—
<i>Myotis peshwa</i>	<i>Basilisa majuscula</i>
<i>Pipistrellus coromandra</i>	—
<i>Pipistrellus ceylonicus</i>	<i>Basilisa roylii roylii</i>
<i>Tylonycteris pachypus</i>	<i>Nycteribia allotopa</i>
<i>Scotophilus temmincki</i>	<i>Nycteribia parvula</i>
<i>Miniopterus schreibersi</i>	<i>Penicillidia indica</i>
	<i>Brachytarsina amboinensis</i>
	—
<i>Kerivoula picta</i>	

and parasite associations are presented in the accompanying list. Among the species found negative included a few specimens of *Taphozous theobaldi*, *Rhinolphus luctus*, *Pipistrellus coromandra*, *Tylonycteris pachypus* and *Kerivoula picta*; and more than a dozen specimens of each of the *Rhinopoma hardwickei*, *Taphozous kachhensis*, *Megaderma spasma*.

India has a representation of more than a hundred species of bats. Approximately 40 species have been recorded from the present study area. The present sample includes 24 common species. Others are apparently rare

or more cryptic in their habit.

A more intensive survey of bat parasites is necessary to have a comprehensive list of Indian bat pupipara.

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REFERENCES

- BHAT, H. R. AND KULKARNI, S. M. (1974): A survey of haematophagous arthropods in western Himalayas, Sikkim and hill districts of West Bengal—Pupipara. *Indian J. Med. Res.* 62 (8): 1121-1133.
- HIREGAUDAR, L. S. AND BAL, D. V. (1956): Some ectoparasites of bats from India. *Agra Univ. J. Res. (Sci.)* 5 (1): 1-134.
- JOBLING, B. (1930): A revision of the genus *Raymondia* Frauenfeld (Diptera, Pupipara, Streblidae). *Parasitology* 22: 283-301.
- (1934): A revision of the genus *Nycteribosca* Speiser (Diptera, Pupipara, Streblidae). *Parasitology* 26: 64-97.
- MAA, T. C. (1962): Records and descriptions of Nycteribiidae and Streblidae (Diptera). *Pacific Ins.* 4 (2): 417-436.
- (1965): An interim world list of batflies (Diptera: Nycteribiidae and Streblidae). *J. Med. Ent.* 1 (4): 377-386.
- (1966): Partial revision of the Cyclopodiinae (Diptera: Nycteribiidae). *Pacific Ins.* 8 (3): 648-685.
- (1968): Addition to the Cyclopodiinae (Diptera: Nycteribiidae). *Pacific Ins.* 10 (1): 1-23.
- (1969): The identity and type host of *Strebla molossa* Giglioli (Diptera: Streblidae). *Pacific Ins.* 11 (2): 495-496.
- (1971): Review of the Streblidae (Diptera) parasitic on Megachiropteran bats. *Pacific Ins. Monogr.* 28: 213-243.
- THEODOR, O. (1955): On the genus *Eucampsiopoda* Kol. and *Dipseliopoda* n.g. (Nycteribiidae, Diptera). *Parasitology* 45: 195-229.
- (1967): An illustrated catalogue of the Rothschild collection of Nycteribiidae (Diptera) in the British Museum (Natural History), with keys and short descriptions for the identification of subfamilies, genera, species and subspecies. *Brit. Mus. (Nat. Hist.)*, London. pp. 506, pl. 5.
- (1968a): Revision of the Streblidae (Diptera) of the Ethiopian region. *Trans R. Ent. Soc. Lond.* 120 (16): 313-373.
- (1968b): New species and new records of Nycteribiidae from the Ethiopian, Oriental and Pacific regions. *Parasitology* 58: 247-276.